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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/596,932	06/29/2006	Robert Lewis Clarke	100770.0025US	2466
24392	7590	12/14/2010	EXAMINER	
FISH & ASSOCIATES, PC ROBERT D. FISH 2603 Main Street Suite 1000 Irvine, CA 92614-6232			PHASGE, ARUN S	
			ART UNIT	PAPER NUMBER
			1724	
			NOTIFICATION DATE	DELIVERY MODE
			12/14/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/596,932	Applicant(s) CLARKE ET AL.	
	Examiner Arun S. Phasge	Art Unit 1724	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 September 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 16-21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Election/Restrictions

This application contains claims 16-21 drawn to an invention nonelected without traverse in the reply filed on 4/2/10. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Claim Rejections - 35 USC § 103

Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bradbury in view of Velin of record for reasons of record.

Bradbury discloses a method of treating a solution comprising nitrate and a metal halide, such as sodium chloride (see col. 2, lines 56-60) comprising:

(I) subjecting the solution to an electrochemical reduction to thereby reduce the nitrate to at least ammonia (see col.2, line 50);

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(II) subjecting the solution from step (I) to an electrochemical oxidation to thereby oxidize the ammonia to nitrogen (see col. 2, line 55), and

(III) subjecting the solution from step (II) to an electrochemical reduction which would inherently reduce the metal hypohalite formed by the anodic oxidation of chloride (col. 2, line 60) to the metal halide (see figure 4 and col. 23-30).

Bradbury further discloses a step of eluting an ion exchange column to which nitrate is bound with an eluent that includes a metal halide to thereby form the solution comprising the nitrate and the metal halide and using the regenerated halide from the electrolytic treatment to elute the nitrate from the ion exchange resin (see col. 4, lines 1-10).

Bradbury further discloses a pH value that falls within the claimed range (see example 1 in columns 5-6). The patent further teaches the use of a membrane (see col. 6, lines 3-10).

The Bradbury patent fails to disclose the concentration of the nitrate and metal halide before the electrochemical reduction step as presently amended and after treatment as further claimed.

Normally, change in concentration is not patentable modification; however, such change may impart patentability to process if ranges claimed produce new and unexpected result which is different in kind and not merely in degree from results of prior art; such ranges are termed "critical" ranges, and applicant has burden of proving such criticality; even though applicant's modification results in great improvement and utility over

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prior art, it may still not be patentable if modification was within capabilities of one skilled in art; more particularly, where general conditions of claim are disclosed in prior art, it is not inventive to discover optimum or workable ranges by routine experimentation. *In re Aller et al*, 105 U.S.P.Q. 233 CCPA (1955).

The Bradbury patent fails to disclose the steps performed in a single electrochemical compartment, which would be accomplished by the reversal of polarity. The patent further fails to teach the exact same electrodes for the anode and the cathode.

The Velin patent is cited to show another process for the removal and destruction of nitrate in water (see abstract). The reference further discloses that the reversal of the electrode reactions can be accomplished by either redirecting the electrolyte from one to the other or the reversing of polarities of the electrodes (see page 3, fourth paragraph). The patent further teaches the use of conventional material, such as Platonized titanium and carbon materials, such as graphite which would render obvious the carbon felt claimed, because such a conventional shape of a type of carbon would have been rendered obvious to one having ordinary skill in the art (see page 3 third paragraph).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Bradbury by the teachings of Velin.

One having ordinary skill in the art would have been motivated to do this modification, because Velin patent teaches the electrolytic removal and destruction of nitrates from solutions by the reversal of polarity and the use of the similar types of electrodes.

Response to Arguments

Applicant's arguments filed 9/21/10 have been fully considered but they are not persuasive.

(1) Applicants argue that "in stark contrast to the claimed subject matter, Bradbury passes the nitrate loaded brine through the central compartment that is filled with an anionic exchange resin to so bind the nitrate to the central resin and to so regenerate the regenerant solution. In other words, the nitrate eluted from the ion exchange resin is re-adsorbed onto the central anionic exchange resin while the brine passes through the central anionic exchange."

However, the Bradbury patent teaches that when a resin is regenerated by brine, which would contain the sodium chloride by definition, the loaded brine is then treated by the process of the invention disclosed by Bradbury to remove and destroy the nitrate (col. 4, lines 1-10). The patent further teaches the mechanism by which the nitrate undergoes destruction by two stages, at the cathode, the nitrate is reduced to ammonia,

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as stated in various literature (col. 2, line 43-52). The patent continues, that the ammonia is further treated at the anode, where it is oxidized to nitrogen **"either directly"** by a formula **"or by indirect oxidation, such as reaction with chlorine from anodic oxidation of chloride."** (col. 2, lines 53-62 emphasis added). If one was to take applicants scenario where the brine is purported to pass through the central anion exchange and only the nitrate is removed, then the second formula would never occur. Furthermore, the second formula for the indirect oxidation shows the regeneration of the brine, because all that is left is the sodium chloride and water.

Applicants further misconstrue the Bradbury patent by stating that only "the nitrate that is electrodialyzed from the central resin that is then subjected to the downstream redox process. This is clearly reflected in col. 1, lines 57-59. Thus, it should be appreciated that Bradbury only subjects nitrate to reduction and subsequent oxidation."

If this reading of the Bradbury patent is correct, then an indirect oxidation would not occur, yet Bradbury continually teaches that the complete destruction to nitrogen occurs by the formulas disclosed above, including the indirect oxidation (col. 2, line 67 to col. 3, line 2 and col. 3, lines 57-59).

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(2) Applicants argue that Bradbury does not teach the concurrent oxidation of a metal halide to a metal hypohalite. The sentence before the formula showing the indirect oxidation states, “**such as reactions with chlorine from anodic oxidation of chloride**” followed by the formula showing such a reaction with chlorine (col. 2, lines 56-61).

Applicants acknowledge that the patent teaches the indirect oxidation presently claimed, however they remark that “such oxidation is stated in the alternative” which is alleged to be further enforced by further readings of the Bradbury disclosure.

The indirect oxidation disclosed by Bradbury in the alternative is the teaching relied upon to make the present rejection and the use of the alternative language does not diminish the teaching.

It is unclear what the buildup of other anions in the electrode compartments up to a balance would be inconsistent with the present claimed invention, since the destruction of nitrate would continue by the reactions disclosed therein even during the buildup of anions until a balance is achieved.

(3) Applicants argue that the Bradbury patent fails to provide any motivation to perform the reduction, oxidation and re-reduction of the nitrogenous species in the

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presence of the metal halides and indeed the anionic exchange resin in the middle chamber is alleged to teach against such a concurrent electrochemical treatment.

It is unclear how merely the fact that the middle chamber contains anion exchange resin would preclude such a device from achieving the mechanisms by which Bradbury teaches the destruction of nitrates to occur. The complete destruction of nitrates to nitrogen only occurs at the electrodes (col. 2, lines 47-62). At the cathode the nitrates are reduced to ammonia, at the anode the ammonia is oxidized by either direct oxidation at the anode to nitrogen or by indirect oxidation by reaction with chlorine (written as NaOCl in the formula) from anodic oxidation of chloride (col. 2, lines 50-60).

It is further unclear where applicants find within the reference or indeed within any other prior art the use of the middle chamber containing anion exchange material would prevent either the anodic oxidation of chloride ions or prevent the passage of the chloride ions to the anode chamber (note that chloride ions are anions like the nitrate ions and the use of the anion exchange material by its very nature of being an anion exchange material would accomplish the same separation to the anode chamber for chloride ions within the nitrate loaded brine solution as nitrates). However, if the patent only disclosed the use of nitrate selective materials, maybe one could make an argument for teaching away. However, the patent teaches the use of "any anion exchange resin" (col. 2, lines 21-31).

(4) Applicants further try to contrast the present treatment solution with the Bradbury method by stating that the present solution comprises a metal halide as presently claimed and would not result in the formation of nitrite.

As stated above, the Bradbury patent discloses the treatment of brine (sodium chloride solution) which is loaded with nitrates that is treated by the two stage electrochemical treatment (see col. 4, lines 1-10 and col. 2, lines 47-62). Therefore, the benefits would occur with the use of the Bradbury process as well.

(6) Applicants argue that the Velin patent only teaches the use of graphite, whereas the claims recite carbon felt. Graphite is a type of carbon. The shape of the graphite, i.e., shaped into a "felt" is given little or no patentable weight in a method recitation.

Accordingly, the claims stand rejection over the prior art of record for reasons of record and the added arguments presented above.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arun S. Phasge whose telephone number is (571) 272-1345. The examiner can normally be reached on MONDAY-THURSDAY, 7:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Arun S. Phasge/
Primary Examiner, Art Unit 1724

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